What is claimed is:

1. A method for computerized calculation of one or more arterial-compliance parameters of a patient, the method comprising:

measuring an oscillometric signal and a tonometric arterial signal of the patient;

obtaining one or more oscillometric parameters derived from the oscillometric signal;

obtaining a sequence of tonometric values that are based on the tonometric signal;

receiving the one or more oscillometric parameters and the sequence of tonometric values as inputs into a computer system;

calibrating the sequence of tonometric values based on the one or more oscillometric parameters to generate a calibrated tonometric pressure waveform; and

processing the calibrated tonometric pressure waveform within the computer system to generate one or more values each corresponding to one of the one or more arterial-compliance parameters.

2. The method of claim 1, wherein the calibrating of the sequence of tonometric values includes calibrating each tonometric value $S_r(t)$ as follows:

$P_r(t)=((S_r(t)+\text{additive correction}_r)*\text{multiplicative correction}_r)$

wherein the additive correction_r and the multiplicative correction_r are calibration constants based at least in part on blood pressure parameters derived from the oscillometric parameters, and each $S_r(t)$ is the tonometric signal value at a time t.

3. The method of claim 1, wherein the calibrating of the sequence of tonometric values includes calibrating each tonometric value $S_r(t)$ as follows:

$P_r(t)=((S_r(t)+\text{additive correction}_r)*\text{multiplicative correction}_r)$

wherein the additive correction_r and the multiplicative correction_r are calculated as follows:

the multiplicative correction_r = $(\text{DBP-MBP}) / (S_r(t_D)-S_r(t_M))$,

the additive $\text{correction}_r = MBP/(\text{multiplicative correction}_r) - S_r(t_M)$,

wherein

each $S_r(t)$ is the tonometric signal value at a time t,

MBP is a mean arterial-blood-pressure oscillometric parameter measured near time t_M, and

DBP is a diastolic-blood-pressure oscillometric parameter measured near time t_D.

4. The method of claim 1, wherein the calibrating of the sequence of tonometric values includes calibrating each tonometric value $S_r(t)$ as follows:

$P_r(t)=((S_r(t)+\text{additive correction}_r)*\text{multiplicative correction}_r)$

wherein the additive correction_r and the multiplicative correction_r are calculated as follows:

the multiplicative $\text{correction}_r = (SBP-MBP) / (S_r(t_S)-S_r(t_M))$,

the additive $\text{correction}_r = MBP/(\text{multiplicative correction}_r) - S_r(t_M)$,

wherein

each $S_r(t)$ is the tonometric signal value at a time t,

MBP is oscillometric mean arterial blood pressure measured near time t_M, and

SBP is oscillometric systolic blood pressure measured near time t_S.

5. The method of claim 1, wherein the calibrating of the sequence of tonometric values includes calibrating each tonometric value $S_r(t)$ as follows:

$P_r(t)=((S_r(t)+\text{additive correction}_r)*\text{multiplicative correction}_r)$

wherein the additive correction_r and the multiplicative correction_r are calculated as follows:

the multiplicative $\text{correction}_r = (SBP-DBP) / (S_r(t_S)-S_r(t_D))$, and

the additive $\text{correction}_r = DBP/(\text{multiplicative correction}_r) - S_r(t_D)$,

wherein

each $S_r(t)$ is the tonometric signal value at a time t,

SBP is oscillometric systolic blood pressure measured near time t_S, and

DBP is oscillometric diastolic blood pressure measured near time t_D.

6. The method of claim 1, wherein the calibrating of the sequence of tonometric values $S_r(t)$ includes generating the calibrated tonometric pressure waveform $P_r(t)$ as follows:

$$P_r(t)=((S_r(t)-b_r)(1/a_r))+\mathbf{p}$$

where a_r and b_r are calibration constants based at least in part on blood pressure parameters derived from the oscillometric signal, and **p** is a hydrostatic pressure head parameter constant.

7. The method of claim 6, wherein the calibrating of the sequence of tonometric values $S_r(t)$ includes calculating:

$$a_r = (S_r(t_D)-S_r(t_M)) / (DBP-MBP) \quad , \text{and}$$

$$b_r= S_r(t_M) - a_r\, MBP \quad , \text{wherein}$$

MBP is oscillometric mean arterial blood pressure measured near time t_M, and DBP is oscillometric diastolic blood pressure measured near time t_D.

8. The method of claim 6, wherein the calibrating of the sequence of tonometric values $S_r(t)$ includes calculating:

$$a_r = (S_r(t_S)-S_r(t_M)) / (SBP-MBP) \quad , \text{and}$$

$$b_r = S_r(t_M) - a_r\, MBP) \quad , \text{wherein}$$

MBP is oscillometric mean arterial blood pressure measured near time t_M, and SBP is oscillometric systolic blood pressure measured near time t_S.

9. The method of claim 6, wherein the calibrating of the sequence of tonometric values $S_r(t)$ includes calculating:

$$a_r = (S_r(t_S)-S_r(t_D)) / (SBP-DBP) \quad , \text{and}$$

$$b_r = S_r(t_D) - a_r\, DBP \quad , \text{wherein}$$

SBP is oscillometric systolic blood pressure measured near time t_S, and DBP is oscillometric diastolic blood pressure measured near time t_D.

10. The method of claim 1, wherein the calibrating of the sequence of values includes using a mean blood pressure value and a diastolic blood pressure value from the oscillometric signal to calibrate the sequence of tonometric pressure values.

11. The method of claim 1, wherein the calibrating of the sequence of values includes using a mean blood pressure value and a systolic blood pressure value from the oscillometric signal to calibrate the sequence of tonometric pressure values.

12. The method of claim 1, wherein the calibrating of the sequence of values includes using a systolic blood pressure value and a diastolic blood pressure value from the oscillometric signal to calibrate the sequence of tonometric pressure values.

13. The method of claim 1, further comprising:

calculating a first compliance value based on the calibrated radial pressure waveform;

estimating end-effects of the oscillometric signal; and

correcting the first compliance value using the estimated end effects.

14. The method of claim 1, wherein the processing of the calibrated tonometric pressure waveform includes estimating a first compliance value using a compliance pressure curve.

15. The method of claim 2, further comprising:

using time points t_M and t_S from the sequence of values based on the tonometric signal, locating corresponding tonometric signal values shifted to the nearest peak (for t_S), nadir (for t_D), and calibrating using the formula $P_r(t)=((S_r(t)+\text{additive correction}_r)*\text{multiplicative correction}_r)$,

using tonometric and oscillometric pressures, P and P_c, computing transmural pressure $P_{TR} = P - P_c$ at each time point,

using P_c and n_c computing V_c,

numerically differentiating the data pairs ($-V_c$, P_{TR}) to obtain

$$C = \frac{dV}{dP_{TR}} = -\frac{dV_c}{dP_{TR}} \quad \text{as a function of } P_{TR}.$$

16. The method of claim 15, further comprising:

plotting $C(P_{TR})$ and reporting C(SBP), C(DBP), C(120), C(80), and pressure at C_{max}.

17. The method of claim 15, further comprising:
calculating a Mean Compliance as follows:

$$\frac{1}{SBP - DBP}\int_{DBP}^{SBP} C(P)dP.$$

17. The method of claim 1, further comprising:

using a tonometric signal to calibrate oscillometric pressure.

18. The method of claim 1, further comprising estimating end-effects of oscillometric sensor apparatus on the oscillometric signal.

19. The method of claim 1, further comprising:

using a tonometric signal to calibrate oscillometric pressure signals in a contralateral arterial site.

20. The method of claim 19, further comprising: processing the calibrated oscillometric pressure signals within the computer system to generate one or more values each corresponding to one of the one or more vascular-compliance parameters.

21. A system for computerized calculation of one or more vascular-compliance parameters of a patient, the system comprising:

a first sensor that measures an oscillometric arterial signal;

a second sensor that measures a tonometric arterial signal;

a first analog-to-digital converter, operatively coupled to the first sensor, that generates a sequence of oscillometric values that are based on the oscillometric signal;

a second analog-to-digital converter, operatively coupled to the second sensor, that generates a sequence of tonometric values that are based on the tonometric signal;

a computer system, operatively coupled to the first and second analog-to-digital converters, wherein the computer system processes the first and second sequences of values and calibrates the sequence of tonometric values based on the one or more oscillometric parameters to generate one or more values each corresponding to one of the one or more vascular-compliance parameters.

22. The system of claim 21, wherein the computer system processes the sequence of tonometric values $S_r(t)$ to generate a calibrated tonometric pressure waveform $P_r(t)$ as follows:

$P_r(t)=((S_r(t)+\text{additive correction}_r)*\text{multiplicative correction}_r)$

wherein the additive correction_r and the multiplicative correction_r are calibration constants based at least in part on blood pressure parameters derived from the oscillometric signal, and $S_r(t)$ is the tonometric signal value at time t.

23. The system of claim 22, wherein the computer system calculates:

the multiplicative $\text{correction}_r = (\text{DBP-MBP}) / (S_r(t_D)-S_r(t_M))$, and

the additive $\text{correction}_r = a_r\,\text{MBP} - S_r(t_M)$, wherein

MBP is oscillometric mean arterial blood pressure measured near time t_M, and

DBP is oscillometric diastolic blood pressure measured near time t_D.

24. The system of claim 22, wherein the computer system calculates:

the multiplicative $\text{correction}_r = (\text{SBP-MBP}) / (S_r(t_S)-S_r(t_M))$, and

the additive $\text{correction}_r = a_r\,\text{MBP} - S_r(t_M)$, wherein

MBP is oscillometric mean arterial blood pressure measured near time t_M, and SBP is oscillometric systolic blood pressure measured near time t_S.

25. The system of claim 22, wherein the computer system calculates:

the multiplicative $\text{correction}_r = (\text{SBP-DBP}) / (S_r(t_S)-S_r(t_D))$, and

the additive $\text{correction}_r = a_r\,\text{DBP} - S_r(t_D)$, wherein

SBP is oscillometric systolic blood pressure measured near time t_S, and DBP is oscillometric diastolic blood pressure measured near time t_D.

26. The system of claim 21, wherein the computer system processes the sequence of tonometric values $S_r(t)$ to generate a calibrated tonometric pressure waveform $P_r(t)$ as follows:

$$P_r(t)=((S_r(t)-b_r)(1/a_r))+ \mathbf{p}$$

where a_r and b_r are calibration constants based at least in part on blood pressure parameters derived from the oscillometric signal, and $\mathbf{p}$ is a hydrostatic pressure head parameter constant.

27. The system of claim 26, wherein the computer system calculates:

$a_r = (S_r(t_D)-S_r(t_M)) / (\text{DBP-MBP})$, and

$b_r = S_r(t_M) - a_r\,\text{MBP}$, wherein

MBP is oscillometric mean arterial blood pressure measured near time t_M, and DBP is oscillometric diastolic blood pressure measured near time t_D.

28. The system of claim 26, wherein the computer system calculates:

$a_r = (S_r(t_S)-S_r(t_M)) / (\text{SBP-MBP})$, and

$b_r = S_r(t_M) - a_r\,\text{MBP}$) , wherein

MBP is oscillometric mean arterial blood pressure measured near time t_M, and SBP is oscillometric systolic blood pressure measured near time t_S.

29. The system of claim 26, wherein the computer system calculates:

$a_r = (S_r(t_S)-S_r(t_D)) / (SBP-DBP)$, and

$b_r = S_r(t_D) - a_r DBP$, wherein

SBP is oscillometric systolic blood pressure measured near time t_S , and

DBP is oscillometric diastolic blood pressure measured near time t_D .

30. The system of claim 21, wherein the computer system uses a mean blood pressure value and a diastolic blood pressure value from the oscillometric signal to calibrate the sequence of tonometric pressure values.

31. The system of claim 21, wherein the computer system uses a mean blood pressure value and a systolic blood pressure value from the oscillometric signal to calibrate the sequence of tonometric pressure values.

32. The system of claim 21, wherein the computer system uses a systolic blood pressure value and a diastolic blood pressure value from the oscillometric signal to calibrate the sequence of tonometric pressure values.

33. The system of claim 21, wherein the computer system calculates a first compliance value based on the calibrated radial pressure waveform, estimates end-effects of the oscillometric signal; and corrects the first compliance value based on the estimated end effects.

34. The system of claim 21, wherein the computer system generates a first compliance value from a compliance pressure curve.

35. The system of claim 22, wherein the computer system:

uses time points t_M and t_S from the sequence of values based on the tonometric signal, and locates corresponding tonometric signal values shifted to the nearest peak (for t_S), nadir (for t_D), and calibrating using the formula

$P_r(t)=((S_r(t)+\text{additive correction}_r)*\text{multiplicative correction}_r)$,

uses tonometric and oscillometric pressures, P and P_c, to compute transmural pressure $P_{TR} = P - P_c$ at each time point,

uses P_c and n_c to compute V_c, and

numerically differentiates the data pairs ($-V_c$, P_{TR}) to obtain

$$C = \frac{dV}{dP_{TR}} = -\frac{dV_c}{dP_{TR}} \quad \text{as a function of } P_{TR}.$$

36. The system of claim 35, wherein the computer system plots $C(P_{TR})$ and reporting C(SBP), C(DBP), C(120), C(80), and pressure at C_{max}.

37. The system of claim 35, wherein the computer system calculates a mean compliance as follows:

$$\frac{1}{SBP - DBP}\int_{DBP}^{SBP} C(P)dP$$

38. The system of claim 21, wherein the first sensor senses the oscillometric signal from one side of a patient, the second sensor senses the tonometric signal from a contralateral arterial site, and the computer uses the oscillometric signal to calibrate tonometric pressure signals in the contralateral arterial site.

39. The system of claim 21, wherein the computer system further estimates end-effects of oscillometric sensor apparatus on the oscillometric signal.

40. The method of claim 21, wherein the computer system further uses a tonometric signal to calibrate oscillometric pressure signals in a contralateral arterial site.

41. A system for computerized calculation of a vascular compliance parameter of a patient, the system comprising:

a first sensor that measures an oscillometric signal of the patient;

a second sensor that measures a tonometric signal of the patient;

means for calibrating the tonometric signal based on the oscillometric signal and for calculating a value for the vascular-compliance parameter.

42. The system of claim 41, wherein the means for calibrating further includes:

means for obtaining a time-correlated dual sequence of digital values that are based on the waveforms monitored by the first and second sensors; and

means for processing the input signals to convert the time-correlated dual sequence of digital values to an output signal corresponding to a value of the vascular-compliance parameter.